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NEW LABORATORY GRINDING EQUIPMENT

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Equipment intended for laboratory and semi-industrial application makes it possible to crush components, in order to obtain batches with prescribed fractions sizes, mix the components, implement their mechanical activation, etc.

The glass and ceramic sectors of industry constantly advance, and their products keep finding new application areas.

With all the variety of used technologies, the first technological stage is the preparation of initial materials, including crushing, grinding, screening, mixing, and activation.

Contemporary developments in mechanical activation, for instance, of a glass batch, include both obtaining an activated surface in the component grains and bringing the components to the required granulometric composition.

The laboratory equipment for laboratory and semi-industrial application offered by us here makes it possible to study various factors which affect the end product.

The equipment consists of a combined crusher and a centrifugal mill which can mutually complement each other. This makes it possible to transform an initial material component in the form of lumps into a batch with a prescribed size of particles and, besides, to perform grinding of samples, efficient mixing, and mechanical activation of components. The common feature of these devices is the continuity of the processes occurring in them.

The combined crusher (Fig. 1) is designed as a combination of jaw crusher 1 and roller mill 2. The size of the initial material lumps is 20–25 mm. The width of the exit slot between the jaws is adjusted from 1 to 3 mm. After passing via the jaw crusher, the crushed materials get in the roller mill, which provides further grinding. The width of the clearance between the rolls can vary from 2 to 0.3 mm.

The output of crushed cullet (from 5–10 to 0.5 mm) is 20 kg/h. The output of crushed ceramic crock reaches 30 kg/h.

The combined crusher is designed in the desk-top variant; it is compact, of size 400 × 500 × 500 mm, weight 60 kg, and consumed power 0.4 kW. The set makes it possible to implement fast preliminary grinding of various materials.

A centrifugal mill which is intended for further grinding and mechanical activation of components and their thorough mixing produces material with the particle size 10–20 μm , the output ranging from 20 to 50 kg/h.

The mill (Fig. 2) contains an eccentric drive 1, which by means of a carrier 2 sets in motion the tube, which is the milling reactor 3 divided into several consecutive milling chambers. The initial particle size is up to 3–5 mm.

Figure 3 represents the milling reactor of the centrifugal mill divided into milling chambers. The initial material gets from the charging hopper 1 into the milling reactor 2, and passing through the milling chambers 3, it is milled under the

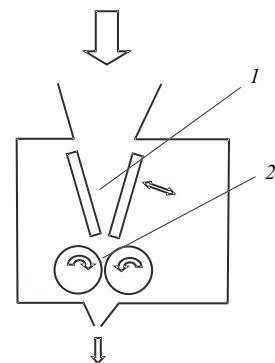


Fig. 1

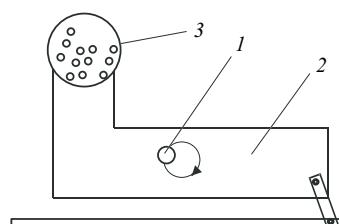


Fig. 2

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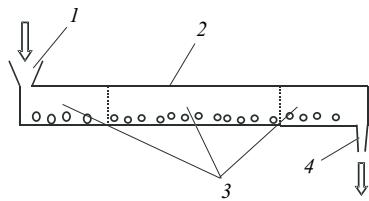


Fig. 3

effect of the balls, whose quantity and sizes, as well as the rotational speed of the drive, control the granulometric composition of the end product at the exit 4. The mill size is $800 \times 700 \times 600$ mm, the weight 150 kg, and the engine power 3 kW.

The experiments in grinding technological waste and cullet used in production of foam glass indicated that the

centrifugal mill is the most efficient equipment for obtaining a required granulometric composition (specific surface area) of the powdered fraction and its subsequent mixing with carbon-bearing components before the foaming and stabilization processes.

A vibroscreening device for the standard set of sieves is intended for the simple but essential operation of screening by fractions. Its distinction from other currently produced screening devices consists in the fact that the sieves move in two perpendicular directions. The device provides for the adjustment of the amplitude and frequency of sieve vibration and is equipped with a timer.

In addition to the above described laboratory and semi-industrial equipment, we produce similar types of industrial equipment of various capacities.